

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

The invention provides compositions and processes for the production of ordered and repetitive antigen or antigenic determinant arrays. The compositions of the invention are useful for the production of vaccines for the prevention of infectious diseases, the treatment of allergies and the treatment of cancers. Various embodiments of the invention provide for a virus, virus-like particle, viral capsid particle, phage or recombinant form thereof coated with any desired antigen in a highly ordered and repetitive fashion as the result of specific interactions. In one specific embodiment, a versatile new technology based on a cassette-type system (Alpha Vaccine Technology) allows production of antigen coated viral particles. Other specific embodiments allow the production of antigen coated hepatitis B virus-like particles or antigen coated Measles virus-like particles.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB 99/01925

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K47/00 C12N7/01 C12N5/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>ESPOSITO, GENNARO (1) ET AL: "Conformational study of a short pertussis toxin T cell epitope incorporated in a multiple antigen peptide template by CD and two-dimensional NMR: Analysis of the structural effects on the activity of synthetic immunogens." EUROPEAN JOURNAL OF BIOCHEMISTRY, (1993) VOL. 217, NO. 1, PP. 171-187. , XP000910191 the whole document</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/--</p>	1-30, 34-49

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

19 June 2000

Date of mailing of the international search report

29.06.00

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Internal Application No  
PCT/IB 99/01925

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BACHMANN M F ET AL: "The influence of virus structure on antibody responses and virus serotype formation." IMMUNOLOGY TODAY, (1996 DEC) 17 (12) 553-8. REF: 48 , XP004071007 cited in the application the whole document	1-30, 34-49
A	WO 94 15585 A (UNIV CALIFORNIA) 21 July 1994 (1994-07-21) page 6 -page 12	1-30, 34-49
A	FROLOV, ILYA ET AL: "Alphavirus -based expression vectors: Strategies and applications" PROC. NATL. ACAD. SCI. U. S. A. (1996), 93(21), 11371-11377 , XP000910193 the whole document	31-33
T	BOORSMA M ET AL: "A temperature-regulated replicon-based DNA expression system." NATURE BIOTECHNOLOGY, (2000 APR) 18 (4) 429-32. , XP000910192 the whole document	31-33

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB 99/01925

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
  
Although claims 35-40 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the composition.
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 99/01925

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9415585 A	21-07-1994	US 5334394 A	02-08-1994
		AU 5600994 A	15-08-1994
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